



# E-Learning Class Size

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A special report of the *State of the Nation: K-12 E-Learning in Canada* project.

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## Executive Summary

In March 2019, the Government of Ontario unveiled its vision for education through a policy entitled *Education that Works for You – Modernizing Classrooms*. From an e-learning perspective, the proposed policy called for a centralization of e-learning courses and a graduation requirement that students take a minimum of four e-learning courses beginning with the 2020-21 school year. Either as a part of, in conjunction with, or simply at the same time, the Government also engaged in a public consultation around class sizes that would increase the class size limit for face-to-face courses to 28 students and increase the limit for e-learning courses to 35 students. The goal of this report is to examine the literature related to e-learning class size in Canada and internationally.

However, before any examination of the literature related to class size, it is important to understand the different roles that educators play – and the different types of educators involved – in the e-learning environment. While in the traditional classroom environment a single teacher may select or design the materials used, deliver the actual instruction in a variety of ways, and support the student as they engage the lesson; in the e-learning environment the research clearly indicates that these roles are performed by multiple educators in different settings. Based on the model of e-learning utilized in Ontario, the two most defined roles are those of the e-learning teacher and the local school based facilitator or mentor. The e-learning teacher being responsible for determining the best pedagogical strategies, methods of assessment, and way to meaningful communicate with their students; while the local facilitator or mentor is responsible for supervisory and administrative duties, technical troubleshooting, and – in some cases – content-based assistance.

The available literature related to e-learning class size demonstrates there has been a historical expectation in Ontario that the class size limit for e-learning courses was the same as the class size limit for face-to-face courses. The literature further demonstrates that across several provinces the class size limit for e-learning courses has ranged from a low of 22 students to a high of 30 students per course. In both Canadian and American jurisdictions where there has been a significant increase in the e-learning class size, student outcomes have also decreased significantly – particularly in full-time e-learning environments. Finally, the literature demonstrates the local facilitator/mentor role must be included in any conversation around class size because that teacher has a significant impact on class size and, more importantly, student success.

The present e-learning model in Ontario clearly describes the importance of the supporting roles of teachers in school settings where students are taking e-learning courses. If teachers at the school level provide substantial levels of support in a wide range of areas, an e-learning class size could be higher than a traditional brick-and-mortar class in that context because there would be two educators that have instructional responsibility for those students. The larger question looming for the implementation of a drastic increase in e-learning in secondary schools in Ontario is how the present supports, which the research indicates are essential for e-learning success, will be scaled for the unprecedented increase of e-learning courses in the province.



## Introduction

In March 2019, the Government of Ontario unveiled its vision for education through a policy entitled *Education that Works for You – Modernizing Classrooms* (Government of Ontario, 2019a). From an e-learning perspective, the proposed policy called for:

The government is committed to modernizing education and supporting students and families in innovative ways that enhance their success. A link to e-learning courses can be found here: [www.edu.gov.on.ca/elearning/courses.html](http://www.edu.gov.on.ca/elearning/courses.html).

Starting in 2020-21, the government will centralize the delivery of all e-learning courses to allow students greater access to programming and educational opportunities, no matter where they live in Ontario.

Secondary students will take a minimum of four e-learning credits out of the 30 credits needed to fulfill the requirements for achieving an Ontario Secondary School Diploma. That is equivalent to one credit per year, with exemptions for some students on an individualized basis. These changes will be phased in, starting in 2020-21.

With these additional modernizations, the secondary program enhancement grant will no longer be required. (Government of Ontario, 2019b, ¶ 9-12)

Either as a part of, in conjunction with, or simply at the same time, the Government embarked on a consultation process focused on class sizes in Ontario and invited public comment.

There were four goals established for this consultation process.

1. **Student Achievement:** Success and well-being of every child.
2. **Protecting Front Line Staff:** The planned changes are to be managed through attrition protection for teachers.
1. **Fiscal Responsibility:** Delivering services in an effective and efficient manner.
2. **Evidence-based Decision Making:** Grounded in sound policy, inter-jurisdictional scans, and empirical research. (Ontario Ministry of Education, 2019, p. 2)

As a part of the consultation guide that was circulated by the Ministry of Education, the proposed changes at the secondary level included:

### Grades 9-12

Grades	Current Status	Proposed Changes
Grades 9-12	<ul style="list-style-type: none"><li>• School board class size averages must not exceed 22 in grades 9 to 12</li><li>• The funded average class size is 22.0</li></ul>	<ul style="list-style-type: none"><li>• School board class size averages must not exceed 28 in grades 9 to 12</li><li>• The funded average class size is 28.0</li></ul>

The government remains committed to modernizing education while continuing to support students and families. In addition to the planned changes in the table above, starting in 2020-21, the government plans to centralize the delivery of all e-learning courses to secondary students in Ontario to allow students greater access to programming and educational opportunities. Secondary students will take a minimum of four e-learning credits out of the 30 credits to fulfill the requirements for achieving an Ontario Secondary School Diploma. That is equivalent to one credit per year, with exemptions for some students on an individualized basis. This will include increased class size for online courses to 35 students. (p. 5)

Based on these proposed change, the Ministry asked for public input on the following questions.

### **Consultation Questions:**

1. What are the opportunities of the planned changes in relation to the four key goals?
2. The new vision for e-learning is intended to provide more programming options for students. What comments and advice do you have?
3. Class size caps exist in many local collective agreements. Do these caps pose a barrier to implementing the new class size requirements?
4. Are there other comments on the planned changes, keeping in mind the four key goals, you would like to provide?

As one of the proposed changes – as well as one of the consultation questions – focuses specifically upon e-learning, and the Ministry desires “evidence-based decision making,” the goal of this report is to examine the literature related to e-learning class size in Canada and internationally.

This report begins with a discussion of the literature that outlines the different teaching roles and responsibilities within the e-learning environment. This is followed by an examination the empirical research and literature around class size in the e-learning environment. While this form of education is referred to as e-learning in Ontario, it should be noted that in other jurisdictions and throughout the literature is may also be referred to as distance learning, distributed learning, online learning, and virtual schooling (among many other terms). In this report, the author will use the term e-learning; unless referring to a specific piece of literature that uses one of the synonyms (in which case the exact term from the literature is used).

### **Literature Review**

One of the difficulties with examining class size in the e-learning environment is which teachers of those involved in the support of a students’ e-learning are counted and how they are counted. In a face-to-face classroom environment, the teacher is responsible for evaluating and selecting resources that aid in the design of the instructional activities that take place in the classroom for their students. The teacher is responsible for enacting that instructional plan to teach the material to their students in whatever form that may take. Finally, the teacher is responsible for supporting the student as they engage with the instructional activities that the teacher has designed and delivered. However, the reality of the e-learning environment is that

each of these roles – in addition to others such as assessment – may be undertaken by different individuals and, at times, even the technology itself used.

One of the first researchers to explore the diffusion of the role of the teacher in the e-learning environment was Niki Davis and her colleagues, as a part of a U.S. Department of Education’s Fund for the Improvement of Post Secondary Education (FIPSE) funded project at Iowa State University entitled "Teacher Education Goes Into Virtual Schooling" (TEGIVS). As a part of that research project, Davis presented a vision of the supplemental e-learning classroom<sup>1</sup> depicted in Figure 1.

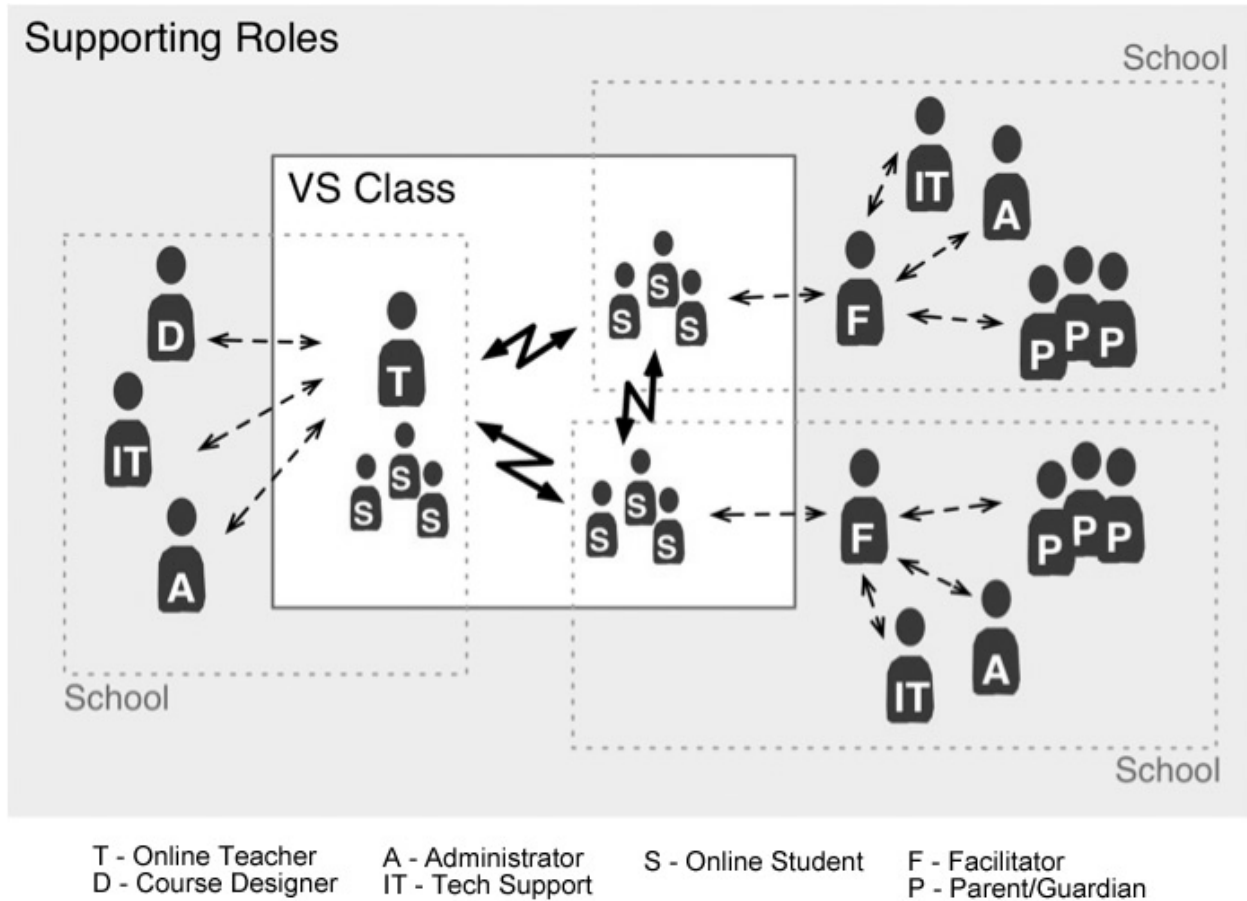


Figure 1. The instructional context of a supplemental e-learning environment (Davis, 2007)

In this particular context, the e-learning class is the white area with the solid line border (i.e., entitled “VS Class” or “Virtual School Class” in the figure). That e-learning class has a teacher and nine students, three from each of the three schools shown in the figure (i.e., each school is indicated by a dashed line border). Within each of the schools, there is a local facilitator to support the e-learning students. There is also a local school administration, such as a principal, vice principal, guidance counsellor, etc.; and each school also has local technical support.

<sup>1</sup> Supplemental e-learning refers to a situation where the student is enrolled in a brick-and-mortar or physical school, and is taking one of more classes through e-learning to supplement their face-to-face classes.

Finally, there is also a course designer, often a teacher or team of teachers that were responsible for designing the e-learning course in the first place.

In Figure 1, the roles of the classroom teacher described earlier have been diffused into three separate teacher roles:

- Course Designer – Design instructional materials. Works in team with teachers and a virtual school to construct the online course, etc.
- Online Teacher – Presents activities, manages pacing, rigor, etc., Interacts with students and their facilitators, Undertakes assessment, grading, etc.
- Facilitator – Local mentor and advocate for students(s), Proctors & records grades, etc. (Davis, 2007).

While Davis was the first to examine how e-learning has impacted the roles that educators undertake in the e-learning environment, she has not been the last.

Later, Ferdig, Cavanaugh, DiPietro, Black and Dawson (2009) further delineated the different roles that teachers might undertake in the e-learning environment into eight separate responsibilities. As expected, there was a great deal of overlap in many of the individual roles.

*Table 1. Comparison of the various roles in the e-learning environment*

Davis' roles	Davis' responsibilities	Ferdig et al.'s roles	Ferdig et al.'s responsibilities
Designer	Designs instructional materials. Works in team with teachers and a virtual school to construct the online course, etc.	Instructional Designer	The creator of the online course in accordance with content standards using effective strategies for the learners and the content.
Teacher	Presents activities, manages pacing, rigor, etc. Interacts with students and their facilitators. Undertakes assessment, grading, etc.	Teacher	The educator with primary responsibility for student instruction within an online course including interaction with students and assigning course grades.
Facilitator	Acts as local mentor and advocate for students(s). Proctors and records grades, etc.	Online Facilitator	The person who supports students in a virtual school program. The facilitator may interact with students online or may facilitate at the physical site where students access their online courses.
		Local Key Contact	The professional who assists students in registering and otherwise accessing virtual courses.
		Mentor	The academic tutor or course assistant for students.



		Technology Coordinator	The person who facilitates technical support for educators and students.
		Guidance Counselor	The academic advisor for students.
		Administrator	The instructional leader of the virtual school.

As Table 1 describes, Ferdig and his colleagues expanded upon Davis' role of the facilitator, suggesting that there may be as many as five different professionals involved at the school level to support e-learning students. Further, Ferdig et al.'s model adds the role of the administrator.

Finally, a more recent model that has been developed based on research that has focused on schools in Michigan (i.e., the first jurisdiction in North American to have an online learning graduation requirement), and looks slightly different but contains many consistent elements (Borup, Chambers, & Stimson, 2018).

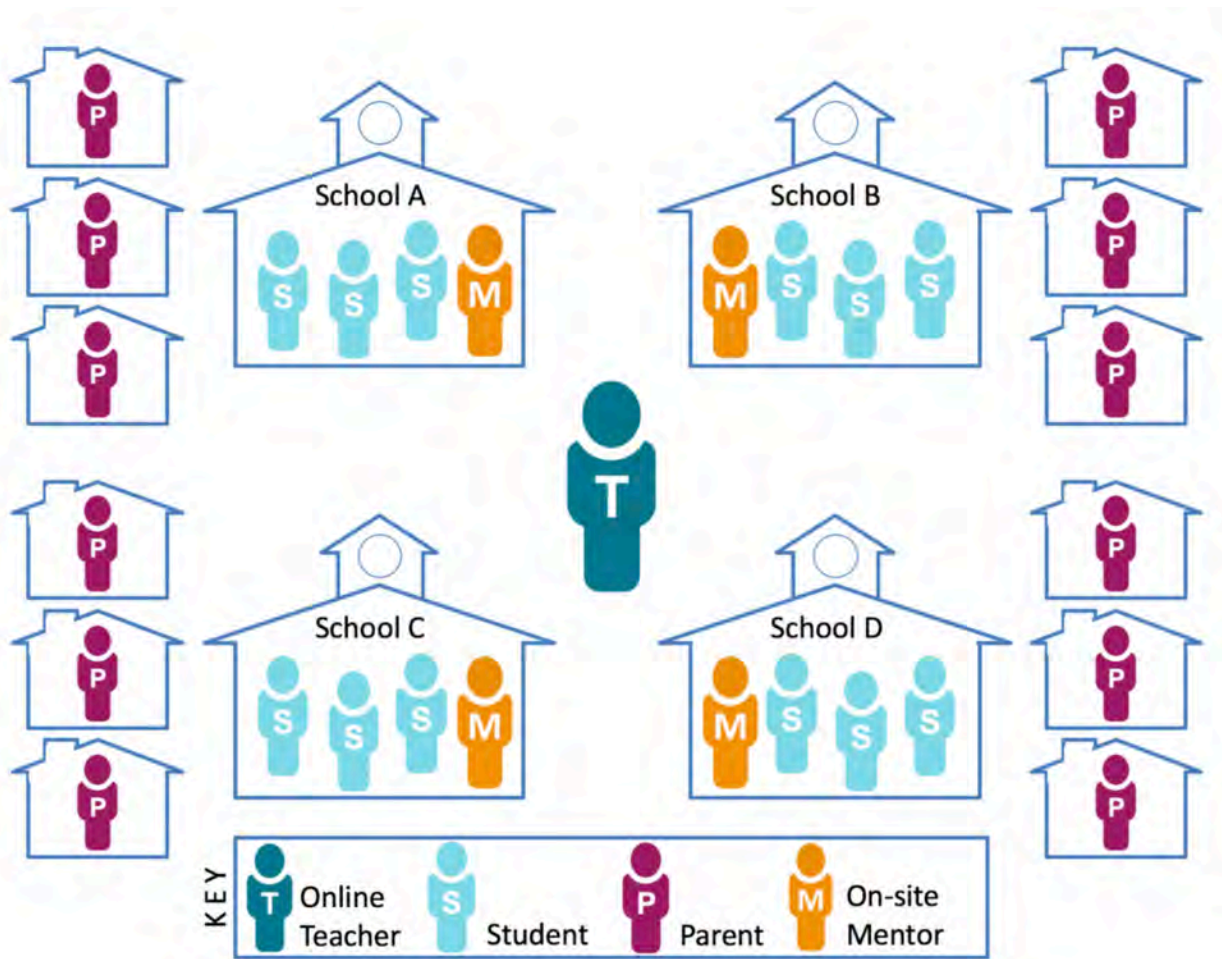


Figure 2. The instructional context of a supplemental e-learning environment

In this model, there are students (S) attending four separate schools, who are being taught by an online teacher (T) that isn't based in any of the four schools. In each of the schools there is a mentor (M), which performs the same responsibilities as the facilitator in the previous models.

In addition to these supplemental models of e-learning, it is important to note that there is also a model of full-time e-learning. While not common in Canada (Barbour & LaBonte, 2018), there is a significant proportion of e-learning students in the United States that never attend a brick-and-mortar or face-to-face school (i.e., these students complete all of their courses at home in an e-learning situation).

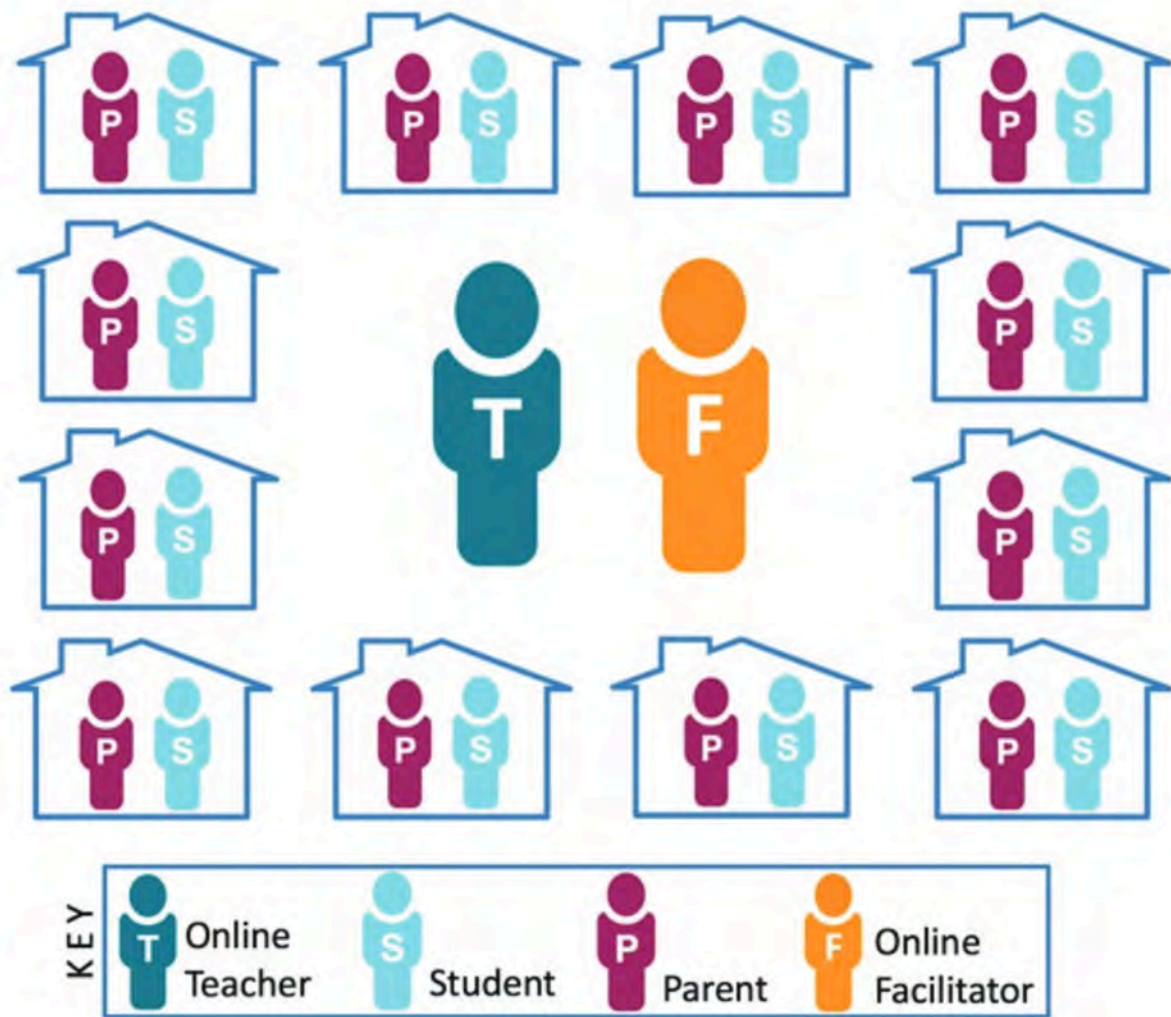


Figure 3. The instructional context of a full-time e-learning environment (Borup, 2018)

As the students in this type of e-learning environment do not attend a regular brick-and-mortar school, they do not have access to those school-based personnel that can provide local education support. One of the best descriptions of the role of the parent in this e-learning context came from a Wisconsin Appeals Court decision in the 2006 case of *Johnson v. Burmaster*, where the judge wrote:

The [e-learning] students, under the direction of their parents, study the materials and complete various assignments to demonstrate their understanding. The parents are provided with instructor's materials to assist the student's learning. The parents check the students' work on their assignments to determine whether the students have mastered the topic. A parent is required to devote four to five hours per day to the student's education.... [the e-learning] teachers... review samples of students' work to assess progress, and hold one to two twenty- to thirty-minute telephone conferences per month with each student and parent, during which they discuss and assess student progress. They correspond with students via email, and respond to parental requests for assistance via email and telephone. [The e-learning] teachers also conduct thirty- to forty-minute interactive online classes using online conferencing software; students participate in such classes two to four times per month. (Johnson v. Burmaster, 2008, pp. 3-4).

While this is not a common form of e-learning in Canada, or in Ontario; it is important to be aware of this model of e-learning to be able to understand the literature that exists around class size and full-time e-learning.

It is important to understand these multiple roles, particularly in the supplemental e-learning environment, because they are built into the model of e-learning that is current mandated in Ontario. The current model of e-learning in Ontario was described by Barbour and Labonte (2017) as:

the Ministry [of Education] provides school boards with access to a learning management system and other tools for the delivery of e-learning, asynchronous course content and a variety of multimedia learning objects, and a variety of other technical and human resource supports (including a "Technology Enabled Learning and Teaching Contact" in each school board). School boards delivering either online or blended learning must sign a "Master User Agreement" to access all of these services. (p. 25)<sup>2</sup>

The *Master User Agreement* is important, as it outlines the definition for the various instructional roles within the e-learning environment in Ontario, as well as guidelines that school board must follow. For example, the *Master User Agreement* defines an eTeacher as:

An e-learning teacher is an Ontario qualified teacher as defined by *The Education Act*. Among other things, e-learning teachers guide classroom discussion; provide opportunities for collaboration and interaction; and conduct assessment for, as, and of learning using the Provincial vLE [virtual learning environment] / LMS [learning management system]. E-learning teachers may provide students with face-to-face or real time support (e.g., orientation, tutorials, remediation). (eLearning Ontario, 2013, p. 2)

In addition to the responsibilities described in this definition, the *Master User Agreement* also requires that all school boards that are delivering e-learning courses must, along other things:

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<sup>2</sup> For more detailed discussion of the current model of e-learning in Ontario, please visit <https://k12sotn.ca/on/>

- assign teachers to teach the online courses and ensuring the courses are included in the required teacher workload as outlined in the collective agreement; and
- ensure that e-learning teachers make themselves available to students at scheduled times to support e-learning students. (p. 10)

The *Master User Agreement* requires that the e-learning teachers themselves must, along other things:

- become familiar with and utilizing teaching tools and communication strategies specific to the e-learning and blended learning environment (e.g., participating in orientation or training sessions);
- ensure standards of academic integrity by designing assessment and evaluation activities that discourage plagiarism and cheating;
- ensure availability during specified time frames for student access and support;
- communicate information on student progress to parents and students regularly and in accordance with the delivering school board policies;
- contact the vendor technical help desk for routine inquiries; any other communication with the ministry or vendor will be through the board contact; and
- conduct parent-teacher interviews. Given that face-to-face parent-teacher interviews may not be possible in all e-learning situations, alternative means may be used, such as telephone, videoconferencing, and e-mail. (pp. 11-12)

In much the same way that a classroom teacher must determine the best pedagogical strategies, methods of assessment, and way to meaningful communicate with their students; The *Master User Agreement* outlines the same expectations for e-learning teachers.

Further, the *Master User Agreement* also requires that school boards that have students enrolled in e-learning courses must, along other things:

- assign personnel for the delivery of the Provincial e-Learning Strategy, including a contact person who will be the liaison with the Ministry on matters pertaining to the strategy;
- establish class sizes and Pupil Teacher Ratios as outlined in provincial and school board policies and as specified in the applicable collective agreement;
- ensure e-learning and blended learning courses are part of the teacher's "workload" as specified in the applicable collective agreement;
- ensure that day school students enrolled in day school e-learning courses are taught by day school grid teachers and placed on the day school funding register;
- provide opportunities for teachers and administrators to engage in professional development and/or in-service activities to ensure effective delivery of e-learning and blended learning programs; and
- ensure that all students, including those with special needs, have equitable access to appropriate e-learning opportunities and support within e-learning courses. (pp. 7-8)

Along with the responsibilities of the school board, the *Master User Agreement* requires that local schools must, among other things:

- ensuring guidance services and special education staff receive training regarding elearning opportunities and enrolment procedures;
- ensuring adequate program support for all students, including those with special needs,
- and making the delivering school aware of these needs prior to enrolment in the course (e.g., orientation sessions); and
- providing a location and proctor for summative evaluations (e.g., final examination, culminating activity), if required, and ensuring the return of the completed examination to the e-learning teacher by a date pre-determined by the delivering teacher, in compliance with teacher workload. (pp. 9-10)

Essentially, in the e-Learning Ontario's *Master User Agreement* all school boards are required to follow a model where students have an e-learning teacher that performs instructional roles equivalent to any classroom teacher AND local support at the school level consistent with the description of the facilitator or mentor from the literature.

### **Methodology**

The goal of this report was to examine the empirical research and literature around class size in the e-learning environment. *Google Scholar* was used as the primary database, supplemented by the library database subscriptions of several Canadian and United States universities. Search terms included, but were not limited to: class size, student-to-teacher ratio, e-learning, online learning, virtual learning, virtual education, virtual schooling, cyber learning, cyber education, cyber schooling, K-12, primary, secondary, and high school.

It should be noted that there is very little literature related to class size or student-to-teacher ratio in the e-learning environment at the K-12 level. There is a significant base of literature related to class size at the K-12 level (see Kokkelenberg, Dillon, & Christy, 2008 for a good overview). Lin, Kwon, and Zhang (2019) actually provided a concise summary when they wrote:

students in small classes have been found to experience higher rates of teacher-student interaction than students in large classes do (Brühwiler & Blatchford, 2011; Zyngier, 2014). Students in smaller classrooms naturally gain more intense individual attention from teachers (Blatchford, Russell, Bassett, Brown, & Martin, 2007; Blatchford, Bassett, & Brown 2011; Ehrenberg et al., 2001), which in turn improves their chances of learning (Konstantopoulos & Sun, 2014), of engaging in active learning (Blatchford et al., 2011), and of achieving high grades (Zyngier, 2014). In addition to fostering more active teacher-student interaction, small class sizes have been found to correlate with decreases in students' misbehavior and increases in their positive learning behaviors in class (Babcock & Betts, 2009; Bascia, 2010; Finn, Panno, & Achilles, 2003). From the perspective of teaching, reducing classroom sizes has been found to result in positive changes in the effectiveness of teaching styles and strategies, e.g., more individualization

of teaching with the aim of increasing class engagement (Brühwiler & Blatchford, 2011), better interaction patterns, use of humor, and classroom organization/rule-setting (Harfitt, 2013), and increased teacher-parent interaction (Bascia, 2010). (p. 319)

Similarly, there is a growing body of literature related to class size and e-learning in post-secondary contexts. Again, Lin et al. (2019) provided a partial summary when they wrote:

At the teacher level, small online classes have been seen as keeping working loads at a reasonable level, and thus enabling a sufficient quantity and quality of feedback and student–teacher interaction, as well as adequate time for grading (Sorensen, 2015; Tomei, 2006). At the student level, meanwhile, online instructors have argued that large classes impede active student–student interactions as well as student–teacher ones (Arzt, 2011; Orellana, 2006; Taft, Perkowski, & Martin, 2011). Studies aimed at identifying the optimal online class size in post-secondary settings have recommended sizes in the range of 12–30 students. (p. 320)

However, there is only a small amount of literature – and to date only a single empirical study – that examines class size in the K-12 e-learning context.

As class size in K-12 e-learning environments has been a theme in previous reports prepared by the *State of the Nation: K-12 e-Learning in Canada* researchers, the data from those earlier studies formed a starting point for this exploration. The first report by Barbour and Adelstein (2013) explored labour issues related to teaching in K-12 online learning based on two areas: an examination of teaching in an e-learning environment in comparison to teaching in a traditional classroom environment and a review the relationship of teachers’ unions with e-learning in various jurisdictions. The authors based their exploration on a review of the existing literature. The second report by Barbour (2017) explored the written provisions for the working conditions of e-learning teachers in Canada based on a document analysis of language in one provincial collective agreement, local contracts in two additional provinces, and teacher union policy related to e-learning in one province. Both of these reports described much of the general literature related to class size in the K-12 e-learning environment.

## **Results**

To date, there is almost no research that specifically examines the impact of e-learning class size on student outcomes. The research that is available is descriptive in nature (i.e., describing the current or desired context of e-learning class size). For example, Barbour (2017) explored written provisions of various collective agreements, contract language and union policies related to the role of e-learning teachers in Canada. One of the main themes outlined in that report was that clauses related to teacher working conditions were the most common items represented, specifically 1) the requirement that e-learning be considered a part of the teacher’s formal workload; 2) included class size limits for e-learning courses; and 3) reference the unique nature of teaching in a e-learning environment and, as such, require additional and specific professional development.

With respect to e-learning class size limit in Ontario, four of the five contract language samples provided by the Ontario Secondary School Teachers Federation for Barbour's study included statements that e-learning courses must follow the class size limits for face-to-face courses. For example, in one letter of understanding is stated "for the life of the 2008-2012 collective agreement E-Learning courses will comply with class size maximums" (p. 18), while another stated that "all electronically-delivered courses will be subject to the class size maxima as outlined in Article X of the Collective Agreement" (p. 20). Similarly, an article in one collective agreement stated that "e-learning courses for secondary school students shall be subject to the same class size restriction as other classes in secondary schools" (p. 20). These samples were consistent with an earlier vignette provided by the Ontario Secondary Schools Teachers Federation District 12 Secondary Teachers Bargaining Unit that appeared in the 2013 edition of the annual *State of the Nation: K-12 e-Learning in Canada* report (Barbour, 2013). According to that vignette, the local bargaining unit gained the protection for e-learning teachers that the "class size limits that apply to traditional classes will also apply to e-learning classes" (p. 52). The proposed increase of the class size limit to 35 students in an e-learning course, which is seven students or 25% higher than the face-to-face class size limit of 28 students, represents a significant departure from these earlier models.

Another jurisdiction where the class size limit for e-learning courses has been included in the collective agreement between the government and the teachers union is Nova Scotia. In a section devoted specifically to 'Distributed Learning' (i.e., a common term used for e-learning or distance learning), which includes 12 separate clauses, the eighth clause states:

49.08 The maximum number of students permitted in a distributed learning course shall be twenty five (25).

It should be noted that this maximum e-learning class size represents 10 fewer students than is being proposed in Ontario. Interestingly, the previous version of this clause from the collective agreement stated that

49.06 – (i) Where existing video and audio transmission technologies are being utilized for distance education in schools, the maximum number of students enrolled in a distance education course at all sites should not exceed twenty-two (22) students, unless the School Board can demonstrate to the Union the feasibility of increasing the number to a maximum number of twenty-five (25) students. The maximum number of sites shall not exceed five (5).

(ii) In the event new technologies are used in the delivery of distance education courses, the parties agree to meet to determine the appropriate number of sites, student numbers, and other related educational issues. (Government of Nova Scotia, 2010, p. 58)

As a part of their analysis of the various e-learning clauses contained in the collective agreement at the time, Barbour and Adelstein (2013) wrote that this particular clause:

puts a soft cap of 22 and a hard cap of 25 students on all sites. The nature of distance learning requires teachers to interact with students, often more frequently than in the face-to-face environment to ensure student understanding. In a traditional classroom a

teacher has access to additional information, such as visual cues, to gauge student learning. Many of these cues are not available to the [e-learning] teacher. By limiting the class size to 22, the instructor has a better chance of conferencing with each distance learner individually. (p. 30)

While not specifically mentioned by the authors, this earlier clause also limited the number of sites or schools that could be represented among those 22-25 students to five schools. This limitation also recognized the workload that can be placed on teachers with having to deal with facilitators/mentors, technology support, and local school administrators at multiple school sites.

Similarly, as a part of the collective agreement between the Calgary School Board and the Alberta Teachers Association there was special consideration given to the fact that the nature of ‘teaching’ for e-learning teachers was different than for face-to-face teachers and, as such, required a different formula to determine student load. For e-learning teachers in the CBe-Learn program, it was determined that:

One (1) Full Time Equivalent (FTE) assignment for instructional and assignable time for teachers in CBe Learn is 585 student credits, determined by multiplying the number of active students by the number of course credits. If the number of courses multiplied by the course credit weight exceeds 20 (i.e., 4 courses x 5 credits each), consideration will be given to reducing the number of students. A teacher in CBe Learn may agree to other configurations based on credit value of the courses and determined by shared decision-making as per the Staff Involvement in School Decisions document. A maximum of six hours per week may be assigned to non-instructional tasks such as curriculum development, staff meetings, and other district assigned in-service. This provision does not apply to teachers in a regular classroom setting. The parties shall jointly review the operation of this clause and report back to their respective parties by Dec 31, 2015. (Calgary School Board, 2012, ¶ CBe Learn Teachers)

The math involved in the provision roughly translates to 117 students per full time equivalent respectively. In addition to setting a maximum student load, the article also establishes maximum amounts of time that the employer can expect the teacher to spend on tasks often assigned to other roles of the e-learning teachers (e.g., online course development).

Further, Barbour’s (2017) report stated that while there were no examples of collective agreement or contract language from Saskatchewan, the Saskatchewan Teachers Federation (2018) did have a policy related to “Technology and Education.” This policy included a clause that advised “teachers’ workloads must be carefully considered in relation to online education to ensure students’ needs are being met and that teacher workloads are reasonable, clearly defined and encourage balance” (p. 92). Essentially, acknowledging that teaching in a face-to-face setting is different than teaching in an e-learning setting, and that this needed to be taken into consideration when determining issues around teacher workload (e.g., class size limitations).

Interestingly, even though Barbour’s (2017) study was supported by the British Columbia Teachers Federation, at the time of the report the Government of British Columbia had limits on class size for face-to-face courses, but no limits on the size of e-learning classes. This reality has



been of consistent concern to the British Columbia Teachers Federation, at least based on the research that the organization had conducted over the years. For example, in the report *Distributed Learning in B.C., 2002-03*, Kuehn (2003) first stated that e-learning teachers had “lost the protection of class size provisions in the collective agreement [because] electronically delivered distributed learning classes were explicitly excluded from calculating the average class sizes under the regulations that accompany the new legal provisions for class size” (p. 4). Kuehn further reported that:

Teacher-pupil ratios vary among programs, with some teacher loads of 60 or more elementary students for distributed learning. These students do not count in figuring out the district averages as defined in the legislation and ministry regulations. In addition, the hard class size limits in legislation for primary students do not apply to distributed learning programs. Some teachers of secondary distributed learning programs in Regional Distance Education Schools have case loads as high as 400-500 students.<sup>[3]</sup> These numbers are a combination of calculating one student for each course they take and for counseling. This way of describing teacher load is the same as that used in the face-to-face secondary school, where it is likely that the teaching load would be no more than about 200, even under the new imposed teaching conditions. (p. 4)

In many instances these teaching loads were more than twice the amount that would have been allowed under the face-to-face class size limits that had been established. There have been other jurisdictions that have established maximum class sizes on face-to-face classes, but not on e-learning classes. For example, voters in Florida passed an amendment to their state constitution in 2002 that established class size for core classes. At present, the class size limits are set at:

- 18 students in prekindergarten through grade 3;
- 22 students in grades 4 through 8; and
- 25 students in grades 9 through 12. (Florida Department of Education, 2019).

However, e-learning classes are excluded from these requirements. This exclusion has meant that e-learning classes are often used as way to manage these constitutionally mandated limits, as schools can enroll additional students in e-learning to decrease the number of students/teacher in the classes that are covered by the class size mandate (Davis, 2012; Ross, 2013).

The finding that e-learning class sizes in British Columbia were generally significantly higher than the legislated face-to-face class size limit has been a consistent finding in research conducted by the British Columbia Teachers Federation. For example, based on data collected in November 2006 to January 2007 from an online survey and a follow-up focus group interview, a total of 123 e-learning teachers, Hawkey and Kuehn (2007) found that class size ranged from 1-69 students in the elementary environment and 1-179 in the secondary environment. However, not all teachers were allocated 100% of their time to teach online (meaning that some teachers

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<sup>3</sup> It should be noted that in British Columbia most e-learning programs have enrolled students using a continuous intake model (i.e., students can register at any time through the calendar year). As such, how you count the number of students can vary significant depending on if you are counting the total number of registered students, compared to the actual number of active students. In many instances, teachers may be dealing with less than half of the registered students who may be removed from enrolment in the course at a later date if they do not become active.

may have taught 1-179 in addition to their regular classroom load, minus a single section allocated for their online teaching). Further, some educators were in blended classes, while others worked with multiple grade levels throughout the day. Regardless of the actual class size, more than half of the teachers responded they were unsatisfied with their class size and workload. In 2010, the BCTF conducted a follow up to their 2007 research with an informal survey of e-learning working conditions (Kuehn, 2010). E-learning teachers expressed many of the same positive sentiments towards issues such as workspace and resource development. However, some issues appeared to have worsened based on the BCTF data, with increased concerns over workload and the wide range of grades taught over the course of the day. Almost all respondents listed workload as the number one issue for distributed learning educators; which was related to class size (e.g., some teachers indicated they worked with over 200 students a day).

Canadian teachers unions are not the only ones that have put forth the idea that the working environment of e-learning teachers should be similar to their face-to-face counterparts. For example, the American Federation of Teachers (2000) outlined 14 standards of good practice for e-learning based on a survey of 200 of its e-learning members. Among those standards, the following items were included:

2. Faculty must be prepared to meet the special requirements of teaching at a distance.
6. Class size should be set through normal faculty channels.
7. Courses should cover all material.
10. Student assessment should be comparable. (pp. 5-13)

The key issue, not just in the standards quoted above, but all 14 standards placed a strong focus on ensuring similar expectation for e-learning that were found in traditional classroom environments (e.g., class size).

However, within the United States context there is a significant group that believe that technology in the classroom, and especially e-learning, will lead to the undoing of unions and this is why they have been resistant (Peterson, 2010; Sand, 2011). For example, Moe and Chubb (2009) believed the rise of cyber schools (i.e., full-time e-learning schools) would force a chain reaction of events that would negatively impact teachers unions. Their primary concern is that in the United States the majority of full-time e-learning schools are either charter schools or private schools, both of which are rarely staffed with union members (i.e., 12% and 4%, respectively, at the time of their book). So the expansion of full-time e-learning schools would not only lead to more non-unionized teachers, but also drastically decrease the overall number of teachers needed because of this belief that e-learning allows for larger class sizes with no negative impact on student achievement. It should be noted that there are some groups within Canada that share this sentiment that any regulatory criteria placed on e-learning is seen as a limit or restriction (Bennett, 2012; 2017), particularly when it comes to teacher's unions.

In fact, one of the drivers of e-learning in the United States has been a belief that e-learning can allow for larger class sizes with no negative impact on student achievement. However, the research has clearly shown that this is not the case. For example, the National Education Policy Center recently reported that while the national average student-to-teacher ratio

in the United States was approximately 16 students per teacher, full-time e-learning schools reported nearly three times as many students per teacher (i.e., 43.8 students per teacher) (Molnar et al., 2019). It is not surprising that the same report also found that e-learning schools continued to show low performance ratings, with only 48.5% receiving acceptable performance ratings. In fact, this pattern (i.e., high student-to-teacher ratio and poor performance) has been reported in each of the previous seven annual reports from the National Education Policy Center on the topic of e-learning (Miron & Gulosino, 2016; Miron, Shank, & Davidson, 2018; Miron & Urschel, 2012; Molnar et al., 2013; 2014; 2015; 2017). These findings have also been consistent with other organizations. For example, a Mathematic Policy Research study found that traditional public schools have a 17:1 student-to-teacher ratio, while full-time e-learning schools reported a 30:1 student-to-teacher ratio (Gill et al., 2015). A companion study, by the Center for Research on Education Outcomes, found that students in these full-time e-learning schools had academic losses equivalent to 180 fewer days of learning in mathematics and equivalent to 72 fewer days in reading (Woodworth et al. 2015). Overall, this research has consistently found when the e-learning class size increase, it does have a negative impact on student performance.

It is important to note that up to this point, the discussion around the literature related to class size limits has focused solely on the role of the e-learning teacher (i.e., the professional responsibility for overseeing the delivery of the e-learning course). However, the literature has clearly described a variety of other educational professionals that are needed to ensure that e-learning is appropriately designed, delivered, and supported (Borup et al., 2018; Davis, 2007; Ferdig et al., 2009). In particular, the role of the school-based support person or personnel is also important in any discussion of class size limits because the presence or absence of that support can have significant impacts on student achievement (Roblyer, Freeman, Stabler, & Schneidmiller, 2007). For example, research by the National Center for Rural Education Support found that the presence of a specifically trained, and active school-based support person had a significant positive impact on student retention and student performance (de la Varre, Keane, & Irvin, 2010; 2011; Hannum, Irvin, Lei, & Farmer, 2008; Irvin, Hannum, Farmer, de la Varre, & Keane, 2009). The reason the local facilitator/mentor role must be discussed in any conversation around class size is that they have a significant impact on a potential class size maximum. If teachers at the school level provide substantial levels of support in a wide range of areas, including supervisory and administrative duties, technical troubleshooting, and content-based assistance – as was found by Barbour and Mulcahy (2004), an e-learning class size could be higher than a traditional brick-and-mortar class in that context because there were two educators that had instructional responsibility for those students.

This is the type of model that has developed within the province-wide e-learning program in Newfoundland and Labrador. When it was first envisioned, the ministerial panel to examine the current educational delivery model and consider alternative approaches recommended the allocation of school-based personnel, who “would be assigned to distance education classes as part of their normal teaching assignments” (Sparkes & Williams, 2000, p. 76). This local school support would take the form of a mediating teacher or mediating team – individuals who were tasked with providing supervisory, technical, and administrative support to students at their own school enrolled in e-learning courses. As the e-learning program expanded, Barbour and Mulcahy (2009) reported that those local school-based support personnel were spending an increasing amount of their time monitoring students’ progress and assisting the academically

weaker students. During this period, the government established a Teacher Allocation Commission to provide specific recommendations for the allocation of teachers, including those involved in supporting e-learning. As a part of their final report entitled *Education and Our Future: A Road Map to Innovation and Excellence*, Shortall and Greene-Fraize (2007) recommended the allocation of one teaching unit per school for each 175 students to support the delivery of e-learning courses. However, this recommendation has never been implemented.

The only Canadian jurisdiction that did implement a formal allocation for e-learning support at the local school level was British Columbia. In the 2011 annual report of the *State of the Nation: K-12 Online Learning in Canada*, Winkelmanns (2011) described how the Government of British Columbia allowed schools that had students participating in e-learning to be eligible to receive 0.125 of a full-time equivalent for the local or school-based support of their students engaged in distributed learning. At the time, the basic allocation for an e-learning full-time equivalent was \$5,851, so the single course allocation of 0.125 FTE was just over \$731. This funding was designed to be used to offset the cost of providing a teacher to provide local support to the e-learning students during a particular period or block. It should also be known that this support block has since been withdrawn by the Government as a cost cutting measure.

An American jurisdiction that has also implemented this model is Michigan, which e-learning providers are required to have a certified online teacher for their e-learning course and the local school is required to provide a certified teacher to act as a mentor to support the e-learning students who are e-learning at their school. In what likely represents the only study that has directly examined the impact of class size on student success in the e-learning environment, Lin et al. 2019 examined “20,540 [enrollment] records relating to 12,032 students and 233 courses in six subjects, taught by 155 instructors” in the Michigan context (p. 322). These approximately 12,000 students were enrolled in one or more e-learning courses because the course was unavailable at their local school, for credit recovery, due to the student’s learning preferences, to correct or avoid a scheduling conflict, as well as other reasons. The researchers found that overall there was no negative impact on students’ outcomes until the e-learning class reached 45 students, but there was a significant amount of subject area variation. For example, there was no statistically significant impact on increasing class size on student performance in English and foreign language courses. The maximum e-learning class size in social science courses was 42 students before there was a negative impact on the students’ final grade. The maximum e-learning class size was 38 students in mathematics, while science and other subject areas had a maximum class size of 35 students before there was a negative impact on the students’ final grade. However, it should be remembered that students in these classes were overseen by two certified teachers: an e-learning teacher at a distance and a local, school-based mentor. Interestingly, the actual average class size of the 233 courses that were a part of this study was 15 students (Zhang, Liu, & Lin, 2018). The reason research on the local school-based support is important is because the presence of both an online teacher and a facilitator/mentor teacher at the local school level skew the actual class size numbers in these online classes.

## Summary

The Government of Ontario’s March policy announcement has clear implications for the existing structure and delivery of e-learning in the province. The proposed changes of four e-

learning secondary program credits will mean a tenfold increase in e-learning in the province combined with increased class size in secondary schools.

The examination of the literature related to e-learning class size in Canada and internationally underscores the challenge of which teachers involved in a students' e-learning are counted and how they are counted. While class size limits have been set in many jurisdictions in Canada, they typically follow classroom limits, or at least are based on them. Those limits do not consider the supporting roles required of teachers for the evaluation and selection of resources, design of instructional activities, actual instruction, social/emotional support, support for the use of technology, and – finally – assessment. These responsibilities are often shared among several educators and, in some cases, assessment is built into course design and facilitated by the technology. In the regular school classroom (i.e., face-to-face), these roles are often the sole responsibility of a single teacher. The reason that the local facilitator/mentor role must be discussed in any conversation around class size is that they have a significant impact on a potential class size maximum and, more importantly, student success.

While literature on class size demonstrates that higher class sizes can impact student completion in classrooms, to date there is almost no research that specifically examines the impact of e-learning class size on student outcomes. Within several Canadian jurisdictions, and in the United States context, there is also an argument that technology in the classroom, and especially e-learning, will lead to the undoing of teacher unions. The primary concern in the United States is that most full-time e-learning schools are either charter schools or private schools, both of which are rarely staffed with union members. The expansion of full-time e-learning schools could lead to more non-unionized teachers, and also drastically decrease the overall number of teachers needed because of a prevailing belief that e-learning allows for larger class sizes with no negative impact on student achievement. If that, indeed, is the rationale behind the Ontario announcement, the research on these types of programs is disappointing. For example, the latest report by the National Education Policy Center found that e-learning schools continued to show low performance ratings, a pattern (i.e., high student-to-teacher ratio and poor performance) that has been reported in each of the previous seven annual reports on the topic of e-learning from that organization.

The present e-learning model in Ontario clearly describes the importance of the supporting roles of teachers in school settings where students are taking e-learning courses. As well, the Ministry funds one educator per school board to support technology-enabled learning and provides the resources, courses, and tools to teach in the online environment. If teachers at the school level provide substantial levels of support in a wide range of areas, including supervisory and administrative duties, technical troubleshooting, and content-based assistance, an e-learning class size could be higher than a traditional brick-and-mortar class in that context because there would be two educators that have instructional responsibility for those students.

The larger question looming for the implementation of a drastic increase in e-learning in secondary schools in Ontario is how the present supports, which the research indicates are essential for e-learning success, will be scaled for the unprecedented increase of e-learning courses in the province.

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